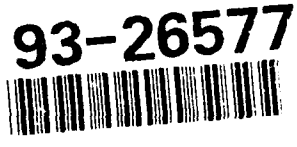
MITRE Technology In Education Project
An English Writing Lab at the Springfield High School of Commerce

M 93B0000094
August 1993

Janet F. Johns
Karen Hachadourian
Springfield Public Schools



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This paper is the design review material for the second MITRE Technology in Education (TIE) project in Springfield, Massachusetts. The project is an English writing lab at the High School of Commerce. The design review was held on 4 June 1993 and the technology installation was completed on 21 June 1993. The design review material defines the users and their needs, provides operational scenarios in the form of instructional strategy models, presents system requirements and the system design, formalizes an operations plan, and describes MITRE's teacher training program.

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ABSTRACT

This paper is the design review material for the second MITRE Technology in Education (TIE) project in Springfield, Massachusetts. The project is an English writing lab at the High School of Commerce. The design review was held on 4 June 1993 and the technology installation was completed on 21 June 1993. The design review material defines the users and their needs, provides operational scenarios in the form of instructional strategy models, presents system requirements and the system design, formalizes an operations plan, and describes MITRE's teacher training program.

ACKNOWLEDGMENTS

This paper is authored by Janet F. Johns of The MITRE Corporation and an educator, Ms. Karen Hachadourian from the High School of Commerce.

We would like to thank the Digital Equipment Corporation (DEC) for their generous contribution of personal computers that has made this project possible. This equipment donation is greatly appreciated.

We would like to thank the following individuals for their commitment and support throughout this process: Dr. Barry Horowitz, Nelson Bolen, Sue Maciorowski, Roger Dumas, and Dr. George Huff from The MITRE Corporation. Janet Johns would especially like to thank Dr. George Huff for the interesting conversations and debates that we had during the many long drives between Bedford and Springfield.

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INTRODUCTION

The MITRE Corporation has initiated a pro bono effort to help public schools make effective use of modern technology. The goal of MITRE's education initiative is to help create standards for educational technology that will make it affordable and sustainable in the public schools. In pursuance of this goal, late last year, MITRE formed a partnership with the Springfield Public Schools to apply technology to the classroom as an integral part of the curriculum.

This document describes the process that was employed to introduce modern technology into an English classroom in a Springfield school. The emphasis is upon the educational applications of technology. The document "Application of Information System Technology to K-12 Education" [1] describes MITRE's overall education initiative and objectives; "MITRE Technology in Education Project at the Springfield High School of Commerce" [2] describes the process that was used to introduce technology into our first project in Springfield, a joint French and social studies effort; and "A Proposal for National Educational Technology Standards (NETS)" [3] addresses the area of technical standards for educational technology.

This document defines a Concept of Operations (CONOPS) and a systems design for the second MITRE Technology in Education (TIE) project in Springfield, Massachusetts. This section contains a brief background description of the MITRE education initiative, and a description of the TIE project mission and objectives. The Appendix is the design review material formally presented at the project design review held on 4 June 1993 at the High School of Commerce. This material defines the users and their needs, operational scenarios in the form of instructional strategy models, system requirements, the system design, an operations plan, and MITRE's teacher training program.

BACKGROUND

As part of the MITRE Technology in Education project, we invited individual teachers and teams of teachers from the middle and high schools in Springfield to submit proposals describing what they would like in terms of new technology and how they would use it. We prepared a "Request for Proposals" to define the objectives and scope of the program. Twenty eight proposals were submitted on 30 September 1992, and on 9 October 1992, after a rigorous selection process by a MITRE/Springfield evaluation team, the first project was selected. The first project was a joint proposal submitted by French teacher Mr. Daniel Battisti and Social Studies teacher Ms. Melinda Pellerin of the High School of Commerce. It is an interdisciplinary project that uses technology (including worldwide communications networks, computers, appropriate software, telephones, camcorders, VCRs and television monitors) to permit students at the High School of Commerce to interact directly with students in the Ivory Coast and in France who are learning English and Social Studies.[3]

The second TIE project is a proposal submitted by Ms. Karen Hachadourian for an English writing lab project at the High School of Commerce. This project was made possible by an equipment grant of Digital Tiger 333sx Personal Computer Systems from the Digital Equipment Corporation (DEC). This proposal covers the 11th grade English Honors, 11th grade Writing Lab, and three sessions of 10th grade English College Preparatory (CP) taught by Ms. Hachadourian. The English curriculum revolves around individual, peer, and group models of interaction, thereby incorporating cooperative learning and collaborative

experiences in class. All of the curriculum aims at improving a variety of basic needs of students, including: writing, reading, thinking, communicating, listening, researching, studying, and interpersonal/relational skills. The DEC personal computers provide the opportunity for all of Karen's students to learn to use computers as an integral part of their English curriculum.

Since April 1993, MITRE and Ms. Hachadourian have worked diligently to plan how technology will be used in her English curriculum, to develop a concept of operations, define technology requirements for these concepts, and develop a system design that would meet the needs of Ms. Hachadourian and her students. The results were presented at a design review held on 4 June 1993. MITRE installed the technology in classroom 107 of the High School of Commerce on 21 June 1993. This paper documents the results of the design review and describes the installed system.

LIST OF REFERENCES

1. Horowitz, Dr. B. M. , Dr. P. J. Negroni, N. E. Bolen, *Application of Information System Technology to K-12 Education*, M92B0000088, August 1992.

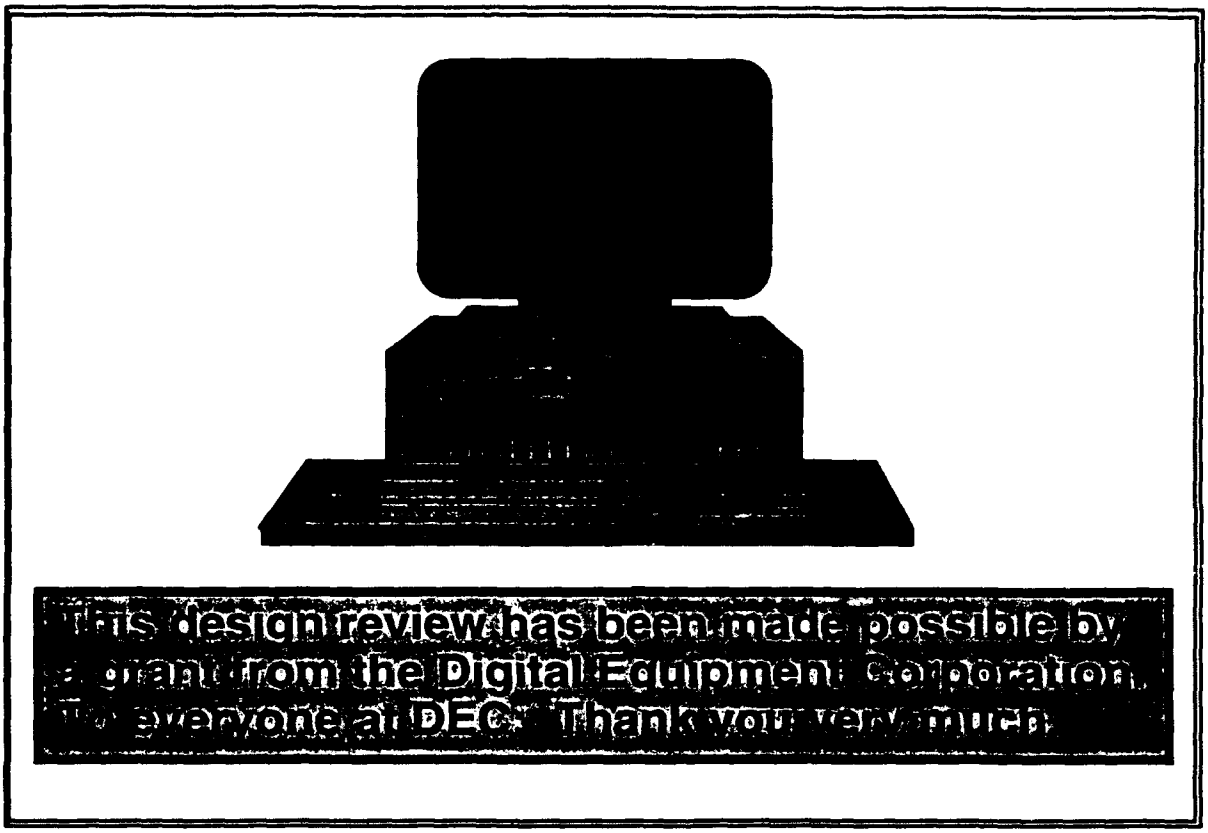
2. Johns, J. F, D. Battisti, M. Pellerin, *MITRE Technology in Education Project at the Springfield High School of Commerce,* M93B0000030, March 1993.

3. Dumas, R. L., *A Proposal for National Educational Technology Standards,* M93B0000071, June 1993.

Appendix

Technology in Education
Design Review

English Writing Lab at the
High School of Commerce


This design review has been made possible by
a grant from the Digital Equipment Corporation.
To everyone at DEC: Thank you very much.

Technology In Education Design Review

Springfield Public Schools:

Karen Hachadourian

The MITRE Corporation:

Janet Johns

4 June 1993

Design Review Agenda

• Introduction	J. Johns
• Technology in the English Curriculum	K. Hachadourian
• Technology in Education Models	K. Hachadourian
• System Requirements	J. Johns
• System Design	J. Johns
• Operations Plan	J. Johns
• Teacher Training Program	S. Maciorowski
• Technology Plans and Budgets	L. Abbott P. Hunter
• Commerce H.S. Plans and Budgets	W. Johnson
• Closure and Action Items	J. Johns

Introduction

- The Design Process
- The Design Review
- The Users and Their Needs
- Typical Class Schedule
- Teacher Needs

The Design Process

Design Activity	Products of the Activity
Understand the problem to be solved	Operational scenarios in the form of instructional strategies that cover the system requirements
Analyze the scenarios to define the requirements	Requirements that satisfy the operational scenarios
Design a system to satisfy the requirements	Software requirements & design Hardware requirements & design Classroom configuration Facility requirements Furniture requirements
Select commercial-off-the-shelf products to implement the design	Specific products that implement the system

The Design Review

- Define the users and their needs
- Describe operational scenarios in the form of Technology In Education Models for the English curriculum
- For each model, provide educational goals, measures of effectiveness, and skills taught to the students
- Derive technology and facility requirements from the models
- Present the design for the initial configuration with future growth plans to fully implement the models
- Describe daily classroom operations with the technology

The Users and Their Needs

- The Learners
  - Acquire a variety of basic skills
  - Become more self aware, responsible, and motivated
  - Develop higher level critical thinking skills
  - Develop/increase sensitivity to/tolerance of others
  - Expand personal horizons/expectations/experiences of creativity and success
  - Make connections between self and curriculum/classroom experiences
- The Educator
  - Provides an atmosphere conducive to meeting student needs more fundamentally, with the integral use of computers and technology
  - Satisfies the varied basic academic and educational needs of the learners

Typical Class Schedule for this Project

Class	Grade	Period	Number of Students[1]
English Honors	11	1	20
Writing Lab	11	2	18
Study Hall		3	
College Preparatory	10	4	18
College Preparatory	10	5A	14
Lunch		5B	
Teacher Preparation		6	
College Preparatory	10	7	17

[1] These are the 92-93 school year class sizes. Class sizes are expected to increase for the 93-94 school year.

Teacher Needs: Integrate Technology into the Curriculum

- Research the use of technology for the lesson
- Select the appropriate technology for the lesson
- Prepare the technology for the lesson
- Prepare classroom lecture materials
- Prepare herself to deliver the lesson through familiarization with technology
- Prepare to assist the students with technology related problems

Teacher Needs: Administrative Support

- Manage Student's Electronic Portfolios
- Manage Gradebooks
- Maintain a Daily Writing Journal
- Maintain a Daily Technology Log
- Exchange Electronic Mail (E-mail) with Writing Colleagues

Design Review Agenda

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Technology in the English Curriculum

- Student needs
  - Goals
  - Skills
- The Educators Mission

Student Needs: Writing and Grammar Goals

- To utilize the writing process
- To organize a three paragraph essay into: introduction, body, and conclusion
- To write about literature and life (self) experiences
- To write about literature, citing textual references
- To be able to paraphrase and to expand specific word choice
- To write in the: descriptive, narrative, persuasive modes
- To utilize: tone, voice, point of view
- To recognize the significance of audience and purpose
- To employ appropriate language/word choice in the consideration of audience in one's writing

Student Needs: Reading and Literature Goals

- To read with comprehension
- To develop critical thinking
- To make connections between literature and life
- To recognize and interpret contextual clues
- To recognize point of view, audience, purpose, tone- in order to utilize in own writing as well as recognize in literature
- To interpret use of various literary devices
- To increase sensitivity to and tolerance and appreciation of different values, norms, and cultures
- To recognize metaphor, symbols, and to incorporate into one's own experience

Student Needs: Listening and Speaking Goals

- To organize presentation in articulate speech pattern
- To specify word choice to communicate
- To listen actively, and respond appropriately
- To listen with comprehension
- To understand input of various media and roles in persuasion of consumer
- To read with appropriate expression

Student Needs: Research Goals

- To understand plagiarism
- To access information
- To compile and integrate information
- To be selective about information
- To realize accountability

Student Needs:
Study Skills

- To understand and utilize a method of study
- To organize time (time management)
- To take notes from multi-media available
- In study halls, utilize technology to improve the amount and manner of study, productive work

The Educator's Mission

My mission as an educator extends beyond the walls of my English and writing classrooms and the teaching of my subject matter to prepare my students for the world beyond our classroom. I want to help my students make the connections between our experiences in class with their personal experiences in the "real" world beyond school, after graduation, whether in further education, work, military, or another endeavor.

I must not only help students prepare for the future with specific writing and reading skills, but with an awareness of:

1. The importance of these (writing, reading) skills as integral life skills which transcend English class;

2. The importance of computers and technology as integral tools in any writing/communication process.

I want to not only develop a more literate, articulate student prepared for a technologically enriched world, but a well-rounded humanities student, aware of multicultural voices, sensitive to human issues, as well as global and environmental needs, and tolerant toward the "differences", as well as the similarities which characterize the human experience.

The English classroom can be such an arena promoting self awareness, growth, and responsibility to self and others. The worlds of literature, writing, and discussion provide the pathways to those ends.

Computers and technology enhance the learning environment by: motivating ("hooking") the student to write more, providing excellent opportunities for cooperative learning, equalizing the opportunities between disparate school environments, and providing quicker access to the worlds of information and creativity possible beyond the traditional classroom setting, more limited in terms of equipment available for use by students and teacher alike.

During the last six years I have really enjoyed my teaching experience with Writing Lab, teaching the course I helped write. It was out of this same experience that I came to realize the impact computers had on "hooking" the student to write, subsequently to write more and better than in the traditional classroom setting. I wanted this same access to equipment for all of my students to experience. This same opportunity, and growth beyond in terms of a truly technologically enhanced classroom, became my dream as a teacher.

When MITRE provided the opportunity for teachers in Springfield to "Dare to Dream", I knew this was my chance to pursue a dream for both my students and myself as an educator. It was my dream for **all** of my students, and is my mission now, and in the future.

Design Review Agenda

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Technology in Education Models

- Writing process models
  - Individual
  - Peer Review
  - Group
- Pen Pal Model
- Class Discussion Model
- Student Oral Presentation Model
- Research Project Model

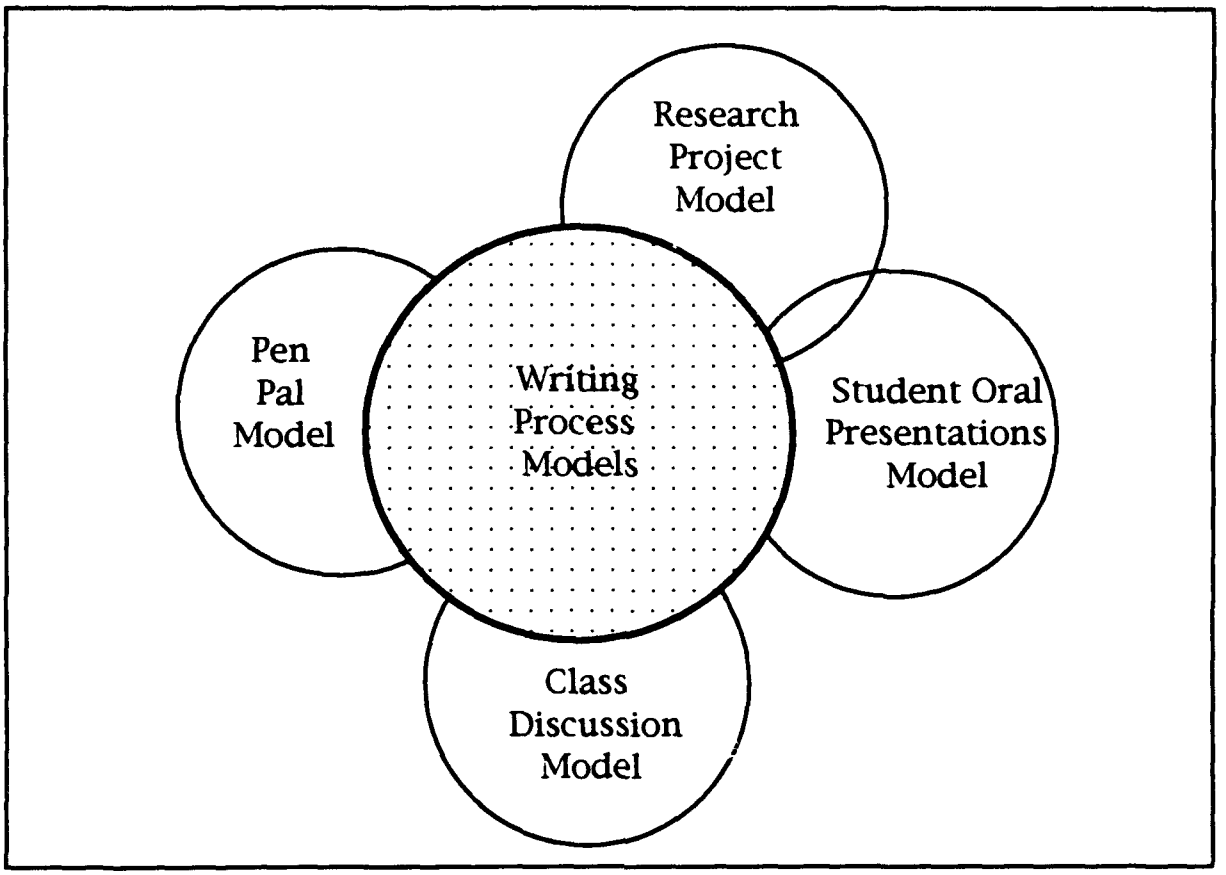

Figure A-1. Technology In Education Models for the English Curriculum

The Technology In Education (TIE) Models are general instructional strategies developed for the English Curriculum. The Models are general enough to be used throughout the English Curriculum and for all grade levels.

At the core of the English Curriculum is the writing process as shown in the Venn diagram. All of the English Curriculum TIE Models use one of the three Writing Process Models (Individual, Peer, or Group) to accomplish the writing assignments. The Class Discussion Model combines teacher led classroom discussions with a writing assignment. The Pen Pal Model uses the Writing Process Models to teach the students to write personal and business letters. The written material for the Student Oral Presentations and the Research Projects are developed using the Writing Process Models.

the teacher and to revise their work based on the teacher's, student's, or a peer's recommendations.

Table A-1. The Individual Writing Process Model

ACTOR	ACTIVITY
Teacher	Discusses purpose/audience of the writing assignment.
Students	Discussion responses to a written model. Prewrite: list of details, brainstorming, free writing Save to utilize later in the writing process
Teacher	Reviews the outline and makes recommendations.
Students	Revise the prewriting. Compose material for the writing assignment rough draft.
Teacher	Reviews each student's material. Assigns a computer to each student. Gives the student a diskette for the writing assignment.
Students	Enter material using the word processor, storing the material on a diskette.
Teacher	Reviews the material on-line with the student. Discusses writing assignment purpose/audience, prescribed focal points, organization of content, mechanics of writing. Makes recommendations for revision.
Students	Revise writing assignment material. Correct grammatical and spelling errors. Print a copy of the writing assignment. Give diskette to the teacher.
Teacher	Reviews and annotates the student's writing assignment. Copies the writing assignment to the student's electronic portfolio diskette.

The basic skills required for the Student to develop written products are learned with the Individual Writing Process Model. The educational goals, measures of effectiveness, and skills taught to the students with the Individual Writing Process Model are:

Table A-2. Individual Writing Process Model Objectives

Educational Goals:

Utilization of writing process approach
Organization of writing: introduction, body, conclusion
Making connections between curriculum and life experiences
Citation of references where necessary
Ability to paraphrase
Expansion of specific vocabulary
Ability to write in various modes: descriptive, narrative, persuasive
Ability to recognize purpose, audience
Ability to utilize tone, voice, point of view
Appropriate language for purpose and audience
Utilization of technology in the process and to improve the process

Measures of Effectiveness:

Performance based, portfolio assessment of assignments
Journal writing

Skills taught to the Students:

Prewriting skills
Revision and editing skills
Organizational skills
Vocabulary building skills
Coherence, classification, and detail development
Citation, paraphrasing, and utilization of senses
Five Ws: Who, What, When, Where, Why
Chronological order, spatial order, and order of importance
Comparison/contrast cause and effect
Denotative and connotative meaning
Simile, metaphor, dialogue
Opinion versus fact
Reasoning versus fallacy
Summarizing and quoting
Computing skills

The Peer Review Writing Process Model teachers the students to work in groups of two. Each student is grouped with a peer to accomplish the writing assignment. With this model, the peers review each other's writing assignment. This model teaches the students to share their work with a peer, to openly accept comment by a peer, accept ownership of writing, and to revise their work based on the peer review, or accept ownership of one's own writing efforts.

Table A-3. The Peer Review Writing Process Model

ACTOR	ACTIVITY
Teacher	Discusses purpose/audience and focal points of the writing assignment.
Students	Do the prewriting for the writing assignment.
Teacher	Reviews the prewriting and makes recommendations.
Students	Revise the prewriting. Compose material for the writing assignment.
Teacher	Reviews student's material. Groups the students into peer review pairs. Assigns a computer to each student, grouping the peer review pairs closely together. Gives each student a diskette for the writing assignment.
Students	Enter material using the word processor, storing the material on a diskette.
Review Peers	Review each other's material on-line or with written notes. Discuss writing assignment purpose/audience. Make recommendations for revision.
Students	Revise writing assignment material.
Review Peers	Discuss grammatical problems and spelling errors.
Students	Revise writing assignment material. Print a copy of the writing assignment. Give diskette to the teacher.
Teacher	Reviews and annotates the student's writing assignment. Copies the writing assignment to the student's electronic portfolio diskette.

With the Peer Review Writing Model, the Students develop peer interactional skills that enable them to share their work and constructively review the work of their peers. The educational goals, measures of effectiveness, and skills taught to the students with the Peer Review Writing Process Model are:

Table A-4. Peer Review Writing Process Model Objectives

Educational Goals:
Peer interaction and evaluation in a constructively critical way
Measures of Effectiveness:
Observation of dynamics by teacher Peer input into the process Improved skills of writer and evaluator Peer recognition of revision/editing needs in partner's work Utilization of technology in process/to improve process
Skills taught to the Students:
Peer encouragement in positive manner Focus on task oriented process Response to specific and open-ended questions Revision/editing skills

The Group Writing Process Model teachers the students to work in groups to accomplish their writing assignments. With teacher instruction and input, the students as a group decide how to organize to accomplish their writing assignments. This is a cooperative learning model that teaches the students to organize and share the work involved with a writing assignment.

Table A-5. The Group Writing Process Model

ACTOR	ACTIVITY
Teacher	Discusses purpose/audience of the writing assignment. Assigns students to groups or allows students choice of group.
Groups	Decide how to tackle the writing assignment as a group within the teacher's guidelines. Assign responsibilities to each group member: leader, spokesperson, secretary, etc. Do prewriting for the writing assignment.
Teacher	Oversees the group's writing process approach. Reviews the outline and makes recommendations.
Groups	Revise the prewriting. Compose material for the writing assignment.
Teacher	(Optional) reviews the group's material. Assigns computer(s) to the group. Gives the group diskette(s) for the writing assignment.
Groups	Enter material using the word processor, storing the material on a diskette.
Teacher	May review the material on-line with the group. Discusses writing assignment purpose/audience, focus points, prescription. Makes recommendations for revision.
Groups	Revise writing assignment material. Correct grammatical and spelling errors. Assess and/or describe the group writing experience. Print a copy of the writing assignment and a group report. Give diskette(s) to the teacher.
Teacher	Reviews and annotates the group's writing assignment on the diskette(s). May add the writing to the electronic portfolios.
Groups	Read and discuss the teacher's annotations. May present group project to class for assessment by peers. (For example, peers vote for the most persuasive ad.)

The educational goals, measures of effectiveness, and skills taught to the students with the Group Writing Process Model are:

Table A-6. Group Writing Process Model Objectives

Educational Goals:
Group interaction and evaluation in a constructively critical manner
Measures of Effectiveness:
Observation of group by teacher Member input into the process, the evaluation of the process, and the product Completion of task Improvement in writing from stage to stage in the process Completion of teacher prescribed or group generated tasks, including delegation of duties Utilization of technology in group process Ability to assess group dynamics after participating in group task
Skills taught to the Students:
Group engagement in positive manner Delegation of responsibilities in order to complete task Writing process and evaluation skills

The Pen Pal Model teaches students to write personal and business letters. The Writing Process Models guide the writing of the letters as an individual, as a member of a group, or with peer review.

Table A-7. Pen Pal Model

ACTOR	ACTIVITY
Teacher Preparation	Sets up a pen pal program with another school, another class, or a community group such as a nursing home. Sets up parameters of the current pen pal project such as; business letters, personal letters, anonymous letters, etc.
Teacher	Gives students guidelines for the current letter and/or responses to letters received from pen pals. Selects one of the Writing Process Models for the letter writing activity (individual, peer review, or group).
Students/Groups	Compose letters for their pen pals based on the current letter guidelines and/or as a response to a received letter.
Teacher/Peer/Groups	May review the letter depending upon nature of project. Make revision recommendations.
Students/Groups	Revise the letter. Correct spelling and grammar. Print the letter.
Teacher	Deliver the letters to the pen pals.
Teachers/Pen Pals	For an anonymous pen pal program, have a year end "meet your pen pal" party.

The Pen Pal Model develops written communication skills to improve the Student's personal and professional communications skills. The educational goals, measures of effectiveness, and skills taught to the students with the Pen Pal Model are:

Table A-8. Pen Pal Model Objectives

Educational Goals:

Ability to distinguish between and write business and friendly letters
Ability to recognize role of letter writing in personal and professional life, and as a community service tool, contributing to a greater sense of a caring community.
Opportunity to meet and relate to another person/writer

Measures of Effectiveness:

Completion of products themselves, in an on-going process

Skills taught to the Students:

Format of friendly and business letters
Ability to communicate/respond appropriately to a received letter
Ability to incorporate purpose and audience in letter writing
Ability to listen and follow directions/prescriptions by the teacher

The Class Discussion Model is a general strategy used by the teacher to lead class discussions, introduce new material to the students, display and discuss student writing, or cover great works of literature. This model uses the Writing Process Models for the students' written products.

Table A-9. The Class Discussion Model

ACTOR	ACTIVITY
Teacher	Selects a teacher writing example, student writing assignment, published model, interdisciplinary subject writing material, or literary example for the class discussion. Many sources may be used to provide the material: - On-line services and networks may be used to access information available from remote libraries, databases, bulletin boards, etc. - Networks may be used to exchange written products with students/peers in other locations. - Multimedia presentations combining text, video, graphics, animation, and other multimedia effects may be used. - Audiovisual access to literary performances available on educational networks may be used. Projects the material for the entire class. Leads class discussions about the material. Solicits oral/written responses to questions.
Students/Groups	Write responses based on - the displayed material - an assigned topic - an issue arising from the class discussions - an interdisciplinary aspect of the displayed material.
Teacher/Students	Use one of the Writing Process Models to prepare written material.

The Class Discussion Model develops oral communication skills that improve the Student's listening skills and participation in class discussions. The educational goals, measures of effectiveness, and skills taught to the students with the Class Discussion Model are:

Table A-10. Class Discussion Model Objectives

Educational Goals:

Interaction among participants in the classroom and various disciplines in order to make connections between those disciplines, and lives of participants in classroom.

Measures of Effectiveness:

Classroom environment stimulated
Participation of members
Completion of prescribed tasks

Skills taught to the Students:

Note-Taking Skills
Listening to discussion, lecture, presentation
Participating in discussion
Contributing as a class member
Following directions for prescribed written and oral tasks assigned
Reinforcement of writing process approach
Making connections between disciplines and "real" life

The Student Oral Presentations Model gives the students oral presentation skills and develops their ability to orally present the results of their own research. One of the Writing Process Models is used to prepare the writing assignment used for the oral presentation.

Table A-11. Student Oral Presentations Model

ACTOR	ACTIVITY
Teacher	Prepares students for oral presentations of work completed with one of the Writing Process Models.
Student or Groups	Select writing assignment from the diskette Project information for the entire class and: - Lecture the class - Lead informal discussions, soliciting oral/written responses - Deliver a formal speech - Practice persuasion with the delivery of an advertisement - Present research material to a visiting interdisciplinary class - Present research project.
The following activities may be used to develop the Student's speaking skills:	
Teacher/Student	Records oral presentations with a camcorder.
Class	Reviews the taped oral presentations.
Teacher	Discusses ways to improve the oral presentations.

The Student Oral Presentation Model develops oral communication skills that improve the Student's listening skills and participation in class discussions. Classroom dynamics is improved through student participation in the classroom presentations. The educational goals, measures of effectiveness, and skills taught to the students with the Student Oral Presentation Model are:

Table A-12. Student Oral Presentation Model Objectives

Educational Goals:

Provide opportunities of a varied nature for successful student oral presentation to the class, the teacher(s), and participants in the classroom.

Measures of Effectiveness:

Completion of task
Organization of task
Communication of information
Articulation of task (enunciation, pronunciation, tone, style, special effects)
Creativity
Citation
Persuasive quality

Skills taught to the Students:

Oral Presentation Skills
Organizational Skills for Oral Presentations
Qualities of persuasion
Role of various media in persuasion
Reinforcement of research and writing processes

The Research Project Model develops the student's research skills and their ability to organize a writing assignment based on their research. Oral presentation skills are developed when the Oral Presentation Model is used to orally present the results of their own research. One of the Writing Process Models is used to prepare the written research report.

Table A-13. Research Project Model

ACTOR	ACTIVITY
Teacher	Prepares students for the research project.
Students	Select a research topic. Use the student's research corner to gather material for the project using current up-to-date sources and techniques.
Teacher/Students	Use the Individual Writing Process Model for the students to prepare a written report for the research project.
Teacher/Students	Use the Student Oral Presentations Model to formally present the research results to the class.

The Research Project Model develops both written and oral communication skills. The educational goals, measures of effectiveness, and skills taught to the students with the Research Project Model are:

Table A-14. Research Project Model Objectives

Educational Goals:

Understanding and utilization of the complete step-by-step research process, from the selection of a topic through the research and writing processes, to the completed research paper.
Provision of accessible, immediate, valid resources to incorporate into research paper and shared research.
To understand plagiarism and accountability.

Measures of Effectiveness:

Completed research paper.
Completed oral presentation.

Skills taught to the Students:

Selection/limitation of topic.
Thesis statement.
Outlining.
Research: (note-taking, documentation, quotations, summaries, paraphrasing).
Rough drafts.
Revision and editing skills.
Subsequent/final draft(s).
Construction of: Title page, (parenthetical) footnoting, works cited page.
Oral presentation skills: selection of material and organization of material.

Design Review Agenda

• Introduction	J. Johns
• Technology in the English Curriculum	K. Hachadourian
• Technology in Education Models	K. Hachadourian
• System Requirements	J. Johns
• System Design	J. Johns
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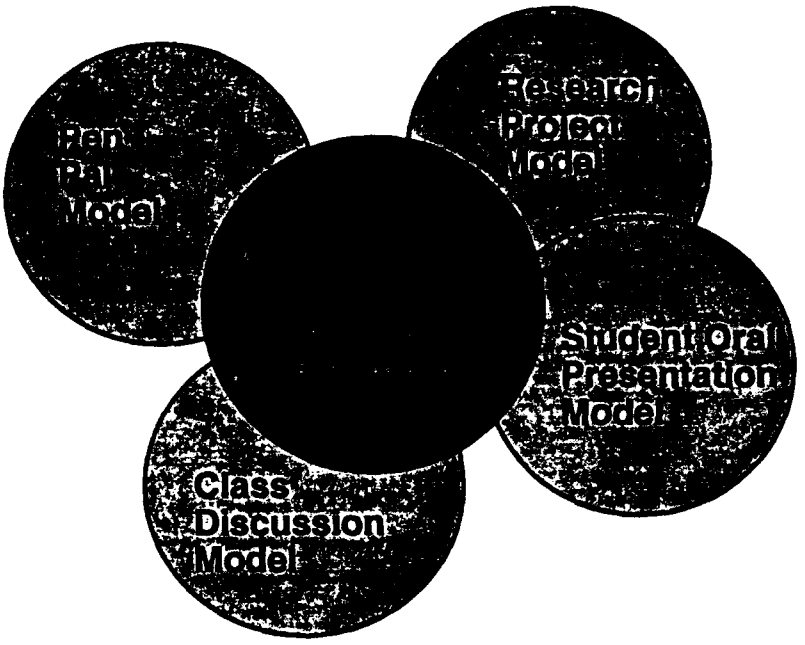
• Closure and Action Items	J. Johns

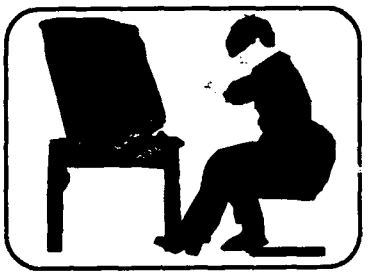
System Requirements

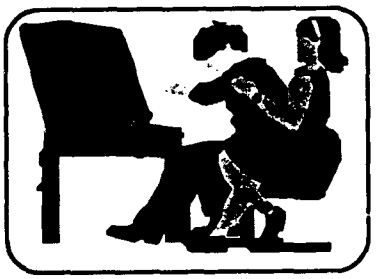
- Requirements derived from the full set of operational scenarios (Technology in Education instructional models):
  - Technology requirements
  - Facility requirements
  - Furniture requirements

Technology In Education Models for the English Curriculum



Writing Process Models (Individual, Peer, and Group) and the Pen Pal Model





Requirements for these models

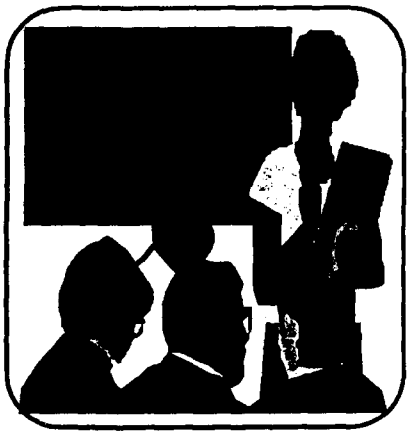
Technology

- Each student requires access to word processing capabilities provided by an individual writing station
- The technology should support peer and larger groups at each writing station

Furniture

- The furniture should support individual, peer, and larger groups working in collaboration

Class Discussion Model and Student Oral Presentations Model



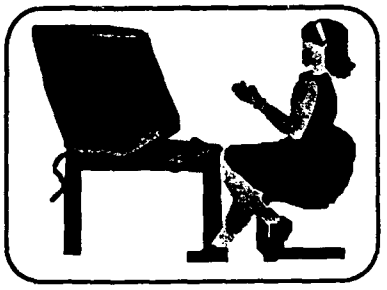
Requirements for these models

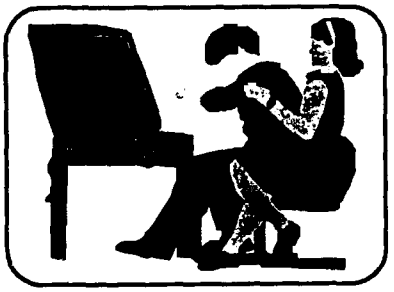
Technology
- An individual writing station
- Computer projection capabilities
- Multimedia capabilities
- Overhead projector
- Overhead projection screen
- On-line services

Facilities
- Window coverings

Furniture arrangements
- Speaker managed presentations
- Classroom audience ability to see and hear the presentations

Research Project Model





Requirements for this model

Technology

- An individual writing station
- Support for peer and larger groups
- Multimedia capabilities
- On-line services
- Research capabilities

Furniture

- The furniture must support individual, peer, and larger groups working in collaboration

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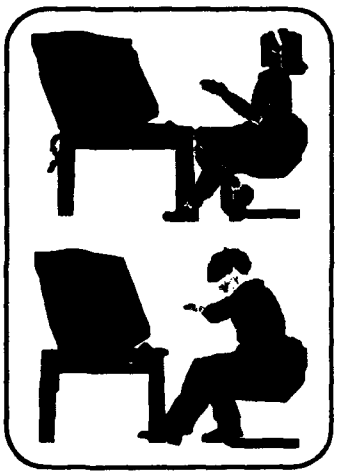
Systems Design

- Major Design Components
- Map Design Components to Technology in Education instructional models
- Elements of the Systems Design:
  - Software requirements and design
  - Hardware requirements and design
  - Facility requirements

Major Design Components

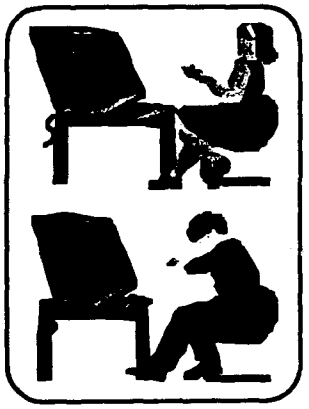


Individual Writing Station

Teacher Technology Corner

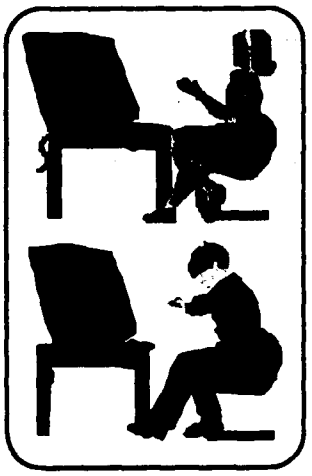
Student Research Corner

Instructional Models Implemented with the Individual Writing Station



- All of the instructional models require that the individual have word processing capabilities
- The Individual Writing Station will satisfy the basic word processing capabilities required by all of the instructional models
- The Individual Writing Station will satisfy all of the requirements for these models:
  - Individual Writing Process
  - Peer Review Writing Process
  - Group Writing Process
  - Pen Pal

Individual Writing Station Software Requirements



The basic software should include:

- A graphical user interface
- Word processing capabilities
- A drawing package

Future capabilities should include:

- A secure desktop
- Word processing integrated with
  - A spelling checker
  - A Thesaurus
  - Professional quality publishing

Individual Writing Station Hardware Requirements

The technology should include:
A personal computer with

1 keyboard
1 mouse
1 monitor (14 inch SVGA)
1 hard drive
1 floppy drive (3.5 inch)
1 RAM (4+ MB)
1 Video RAM (512+ KB)

Future growth capabilities require a network card, connectors, and cabling

Instructional Models Implemented with the Teacher Technology Corner

Presentations to the entire class which involve computer projections, multimedia, and on-line services used by an individual or a group are required by two models:

- Class Discussion Model
- Student Oral Presentations Model

One set of technology, the Teacher Technology Corner, can be used to satisfy these requirements.

Teacher Technology Corner Software Requirements

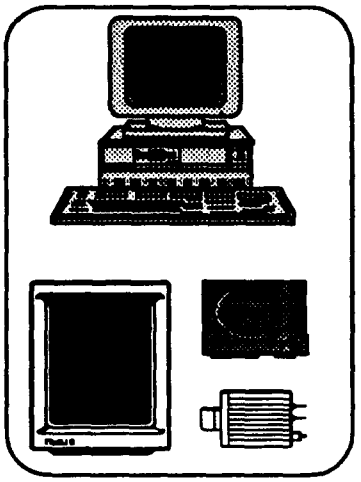
The software should include the same software as the individual writing station plus additional software for:

Oral Presentations
- Computer projections
- On-line services
- Multimedia capabilities

Teacher Administrative Support
- Database capabilities
- Spreadsheet capabilities

Support for the "Teacher as a Writer"
- Professional writing capabilities
- Research capabilities
- Multimedia capabilities
- Electronic mail
- Communication with colleagues

Teacher Technology Corner Hardware Requirements



The technology should include:
- A personal computer with
  - 1 keyboard
  - 1 mouse
  - 1 monitor (14 inch SVGA)
  - 1 hard drive
  - 1 floppy drive (3.5 inch)
  - 1 RAM (8+ MB)
  - 1 Video RAM (1 MB)
- A Liquid Crystal Display (LCD)
- A FAX capable modem
- A CD-ROM drive and sound card
- A laser disk player
- Overhead projector and projection screen

Future growth requirements include:
- A network card, connectors, cabling

Note: A telephone is also required for communication, maintenance calls, etc.

Instructional Models Implemented with the Student Research Corner

One instructional model requires students to be able to perform research with state-of-the-art technology that can access the most recent information available:

- Student Research Model

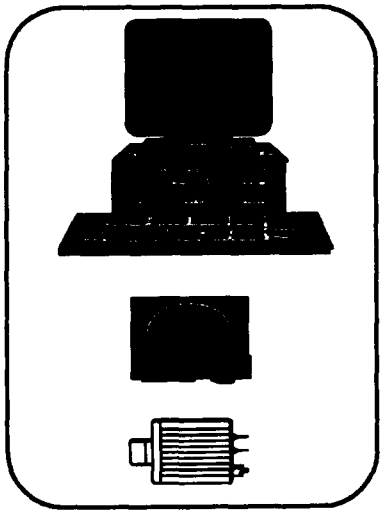
Student Research Corner
Software Requirements

The software should include the same software as the individual writing station plus additional software for:

Research
- Database capabilities
- Spreadsheet capabilities
- Access to electronic mail
- Access to on-line services
- Communication with colleagues

Advanced writing support
- Professional writing capabilities
- Multimedia capabilities

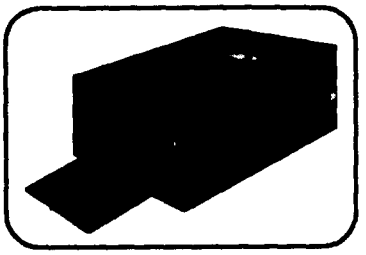
Student Research Corner
Hardware Requirements



The technology should include:
- A personal computer with
  - 1 keyboard
  - 1 mouse
  - 1 monitor (14 inch SVGA)
  - 1 hard drive
  - 1 floppy drive (3.5 inch)
  - 1 RAM (8+ MB)
  - 1 Video RAM (1 MB)
- A CD-ROM drive and sound card
- A FAX capable modem

Future growth requirements include:
- A network card, connectors, cabling

Other Requirements
Printers and a Network



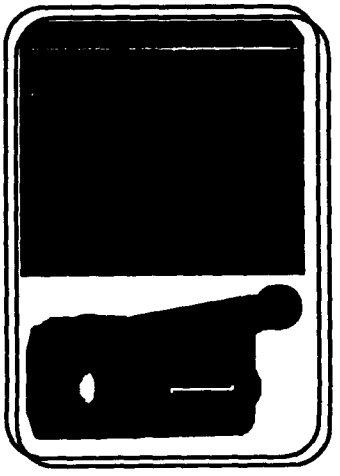
All of the instructional models require the use of a printer.

For the initial configuration, MITRE is donating 3 surplus printers.

Future requirements include a professional quality laser printer and a network so that the printer can easily be shared by all computers in the classroom.

A print server and a professional quality laser printer have been installed in Classroom 106 and can be used for this purpose.

Other Requirements
AudioVisual Configuration Items



The Classroom Discussion Model and Student Research Model require the use of AudioVisual Configuration Items to support the multimedia requirements.

For the initial configuration, a TV, VCR, and camcorder can be borrowed from the school AudioVisual department.

For the final configuration a laser disk player should be provided by the AudioVisual department for this and other classrooms.

Facility Requirements

Requirements

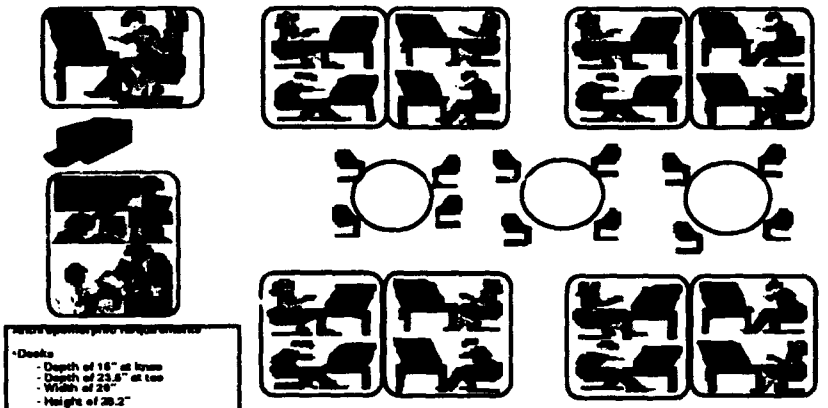
- Furniture
- Electrical
- Security
- Light Control
- Communications

Furniture Requirements

Adequate furniture (desks, chairs, tables, projection screens, etc.) must be acquired to support the teacher's concepts for the:

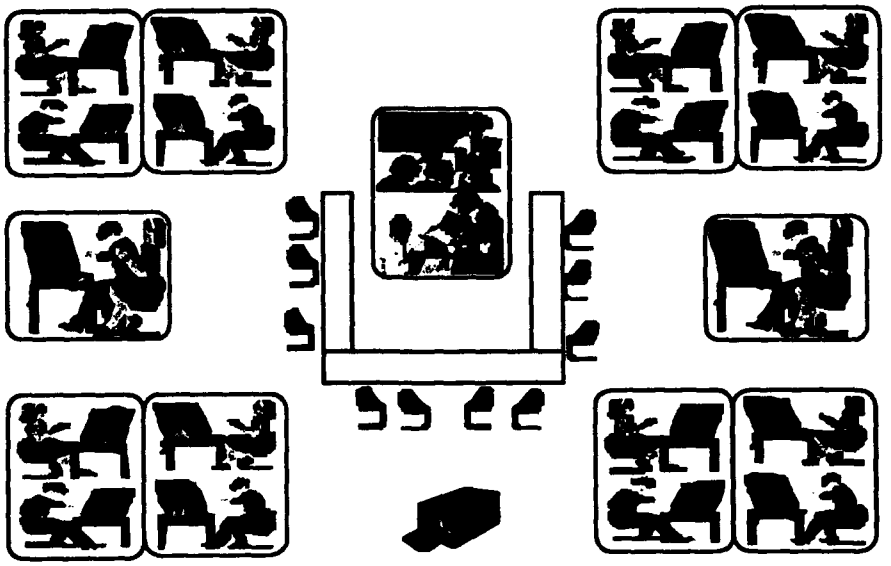
- Individual, Peer, and Group Writing Process Models
- Class Discussion Model and Student Oral Presentations Model with the teacher technology corner
- Student Research Project Model with the student research technology corner

An Ideal Classroom Configuration Featuring Group Activities



- Desks
  - Depth of 15" at knee
  - Depth of 23.6" at toe
  - Width of 29"
  - Height of 28.2"
- Keyboard height: 23-28" from floor
- Display Height: Adjustable so visible between 0 and 60 below horizontal plane passing through eyes

An Ideal Classroom Configuration Featuring Group Activities and Class Discussions



Electrical Requirements

Technology Item	Current	Quantity	Total
Personal Computers	5.5 amps	19	104.5
Printers	4.0 amps	3	12.0
Laser Disk player[1]	3.0 amps	2	6.0
CD-ROM	1.0 amp	2	2.0
VCR[1]	1.0 amp	1	1.0
Large TV (27 Inch)[1]	2.3 amps	1	2.3
Overhead projector	3.0 amps	1	3.0
LCD Panel	3.0 amps	1	3.0
Total Current Requirement (amps)			132.8

[1] It is assumed that these items would be borrowed from the School AudioVisual department.

Security Requirements

- All parties with access to the classroom must be educated about the general safeguards and operating procedures established to ensure the integrity of the hardware and software in the classroom.
- Virus protection software for all computers
- Secure desktop for all computers
- Fully functioning and operational security measures must be installed to protect the technology against theft, vandalism, and other damage. (Sonitrol)
  - The windows must be capable of being secured
  - Exterior doors must have fully functioning locks
  - The closet door must have a fully functioning lock

Light Control Requirements

- The windows must have adequate coverings to control light for the Class Discussion Model and the Student Oral Presentations Model.
- The window coverings should be adjustable to meet varying classroom requirements.
- Broken windows and windows with bullet holes should be repaired.

Communications Requirements

A telephone is required for the teacher to

- Arrange technology maintenance
- Obtain technical support
- Maintain a dialogue with colleagues

Two separate telephone lines are required

- The teacher technology corner
- The student research corner

Future communications requirements include the addition of a network for sharing professional quality printer(s) and other peripherals.

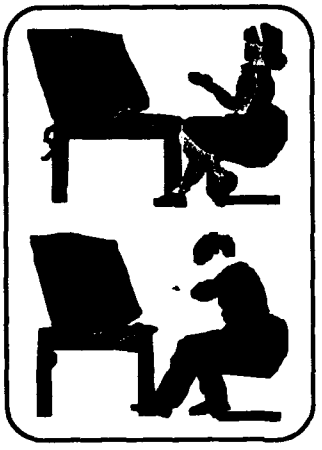
The Implementation: A Phased Approach

- Initial Implementation
  - 19 Individual Writing Stations
  - Basic word processing
  - Print capability
  - Teacher telephone (Springfield Action Item)
  - Overhead Projector and Screen (Springfield Action Item - move from Karen's old room to 107)
- Phased Upgrades
  - Teacher Technology Corner
  - Student Research Corner
  - Network and enhanced word processing

Models Implemented:
Individual Writing Process
Peer Review Writing Process
Group Writing Process
Pen Pal
Some workarounds for:
Class Discussion
Student Oral Presentations
Research Project

Models Fully Implemented:
Class Discussion
Student Oral Presentations
Research Project

Requirements Satisfied with the Individual Writing Station



The Individual Writing Station will satisfy the requirements for

- Individual Writing Process Model
- Peer Review Writing Process Model
- Group Writing Process Model
- Pen Pal Model

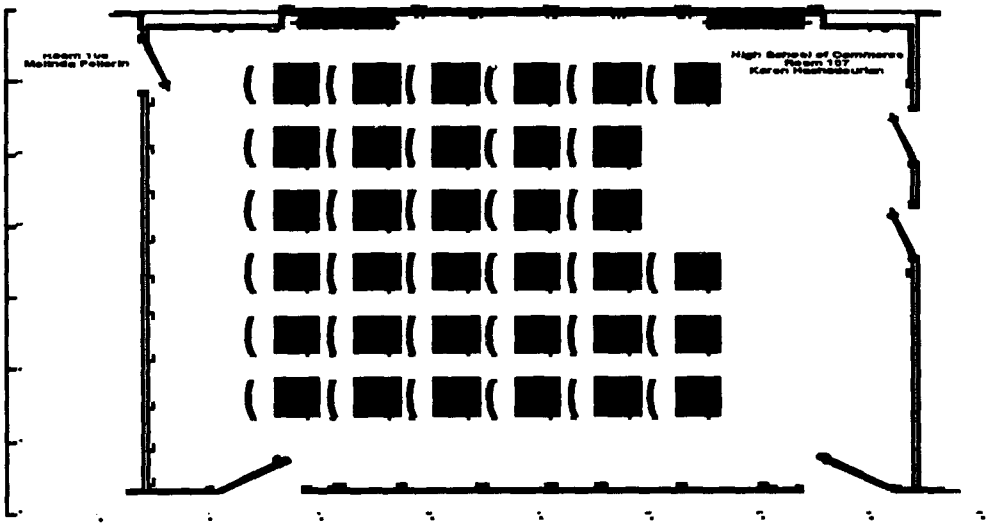
Basic writing process requirements of the remaining models are satisfied by the Individual Writing Station.

Initial Configuration

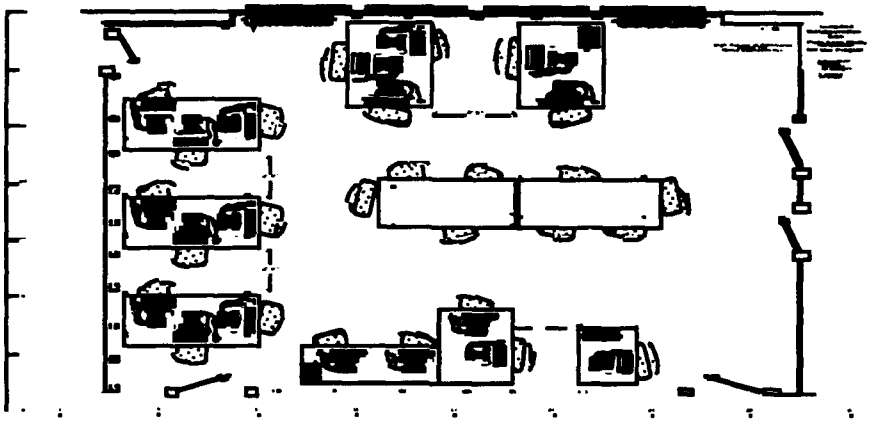
Implement 19 Individual Writing Stations with:

- **The software on each individual writing station is the MS-DOS 5.0 operating system and the MS-Windows 3.1 graphical user interface. MS-Windows 3.1 includes a word processor and a drawing package which satisfies the basic criteria for the writing process models.**
- **The hardware is the DEC 333sxLP personal computer with a 14 inch color VGA monitor, an 85 MB hard disk, a 3.5 inch floppy diskette drive, a keyboard, a mouse, 4 MB RAM, and 512 KB VRAM.**
- **Three printers will be distributed in the classroom for use with the individual writing stations.**

Pre-Installation Furniture Configuration



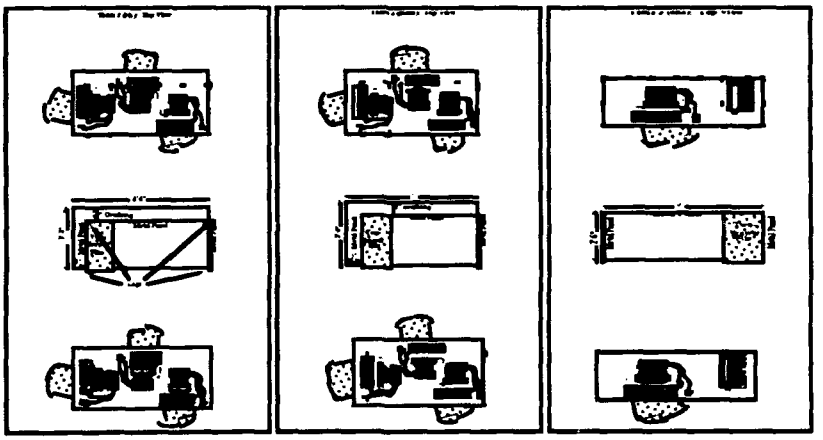
Installation Configuration with Furniture and Computers



The room layout was established by Springfield based on availability of donated furniture and school electrical installation standards.

Detailed Furniture Configuration

Detailed Diagrams of the Furniture Made Available for the Project



Phased Installations to Reach the Full Operational Requirements

The teacher has prioritized the requirements:

① **The Teacher Technology Corner has the highest priority. This technology will enhance the classroom environment for all students by implementing the Class Discussion Model and the Student Oral Presentations Model.**

② **The Student Research Corner has the next highest priority.**

③ **The third phase is the addition of a network for sharing a professional quality printer and an upgraded word processing package integrated with a spelling checker and Thesaurus. This phase will receive low priority because it is desirable for the students to learn valuable edit and revision skills prior to generating a paper product.**

Requirements Satisfied with the Teacher Technology Corner

All of the requirements for the models implemented with the Teacher Technology Corner will <u>not</u> be satisfied with the initial implementation:

- **Class Discussion Model**
- **Student Oral Presentations Model**

Current workarounds include:

- **Borrowing technology from the AudioVisual department**
- **Use of transparencies for class presentations**

Estimated Cost of the Teacher Technology Corner

- The hardware required to equip one of the Individual Writing Stations to be the Teacher Technology Corner is:

– Additional RAM (4 MB SIMM)	$ 200
– Additional video DRAM (512KB)	$ 50
– CD-ROM drive and sound card	$ 649
– Video splitter cable	$ 69
– LCD projection panel	$2000
– FAX capable Modem	$ 169
• Total Hardware Cost :	$3537

- In addition to the above hardware items; CD-ROMs, laser disks, and software for the English curriculum must be purchased. These include professional writing and multimedia presentation design software. Cost is TBD.

Requirements Satisfied with the Student Research Corner

- Writing process requirements of the Student Research Model are satisfied by the initial implementation.
- The research requirements of the Student Research Model will NOT be satisfied by the initial implementation.
- The students will continue to perform research as they did prior to the implementation of this project:
  - School and other libraries
  - Research in the existing MAC laboratory
  - Other school resources

Estimated Cost of the Student Research Corner

- The hardware required to equip one of the individual Writing Stations to be the Student Research Corner is:

- Additional RAM (4 MB SIMM)	$200
- Additional video DRAM (512KB)	$ 50
- CD-ROM drive and sound card	$649
- FAX capable Modem	$169
- Total Hardware Cost :	$1068

- In addition to the above hardware items; CD-ROMs and software for the English curriculum must be purchased. These include professional writing and multimedia presentation design software. Cost is TBD.

Estimated Cost to Upgrade and Network the Individual Writing Stations

- The technology required to upgrade each individual Writing Station to include a network and a word processing package integrated with spell checking and a Thesaurus is:

- Enhanced word processing	$169
- Network card	$200
- Network operating system	$ 90
- Network connector	$ 14
- Cabling	$ 30
• Total Cost per station:	$503
• Total Cost for 19 stations:	$9557

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Operations Plan

- Daily Operations
  - Minimize classroom setup time
  - Minimize class disruptions due to technology problems
- Typical Classroom Scenario
  - Safeguard the integrity of the configuration
  - Reduce technology maintenance time
  - Support electronic student portfolios
- General Safeguards with Flexible Diskettes
  - Minimize computer virus risks
  - Protect software copyrights and licenses
  - Protect student data and ensure the privacy of data
  - Minimize teacher technology maintenance time

Daily Operations
Teacher Responsibilities

- Power on all equipment
- Verification that each computer is functioning properly
- Verification that the user interfaces are consistent
- Teaching of classes
- Power off all of the equipment
- Activation of all security measures
- Lock the doors

Daily Operations
Typical Classroom Scenario

- Students arrive at the classroom
- Teacher hands each Student his/her diskette
- Student stores all files and data on diskette
- Student returns diskette to Teacher when class ends
- Teacher reviews Student's work on the diskette
- Teacher makes annotations on the Student's diskette

Daily Operations
General Safeguards with Flexible Diskettes

- Flexible diskettes may not be brought into the classroom
- Flexible diskettes may not be removed from the classroom
  - Flexible Diskettes removed from the classroom cannot be returned to the classroom and used in the computers
- Data – and only data – may be stored on flexible diskettes
  - Users may not copy another user's data
- Software and other licensed or otherwise controlled information may not be copied to the flexible diskettes
- Flexible diskettes and the hard drives may only be formatted by the teacher or someone with maintenance responsibility

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Teacher Training Program

- The Necessity for Adequate Teacher Training
- Specific Objectives of the TIE Teacher Training Program
- What We've Done So Far
- Training for Karen's Proposal
- Future Training Activities

The Necessity for Adequate Teacher Training

- Many studies indicate that when teachers are inexperienced or uncomfortable with new technology, it will not be utilized
- Technologically-sophisticated teachers
  - Communicate enthusiasm about the subject matter to students
  - Inspire students themselves to use the technology effectively
  - Have the confidence to deal with students who know "more" than they do
  - Can focus on making the technology work for them in the classroom, rather than wasting class time learning to use it

Therefore, MITRE has made teacher training an integral part of the TIE project

Specific Objectives of the TIE Teacher Training Program

- To introduce teachers, via hands-on activity, to current desktop computer capabilities, trends, and jargon
  - Windows, menus, icons, graphics
  - Multimedia (CD-ROMs, laser disks, hypermedia
  - Networking
- Initially, to address the use of specific software applications, primarily word processing and drawing packages

The goal is to make teachers aware of modern technology potential and to enhance their ability to put together credible plans and proposals for technology in their classrooms

Specific Objectives of the TIE Teacher Training Program (continued)

- To provide training in specific technologies and applications to TIE proposal winners
  - Melinda: Microsoft Windows, Microsoft Word, Decisions Decisions, Prodigy, CD-ROMs
  - Dan: Macintosh, Minitel, Microsoft Works, French Dictionary/Thesaurus, spreadsheet gradebook, custom French lessons
  - Karen: Microsoft Windows, MS Write, Paintbrush

The goal is to full integrate technology, instructional approach and curriculum.

NOTE: MITRE can assist in making technology effective in the classroom, but the teachers need to tell us what instructional techniques they like to use.

What We've Done So Far

- July's workshop offered several opportunities for hands-on experience
- Two "open" training sessions were held at MITRE, one in September (10 attendees) and one in December (8 attendees)
- Specialized training sessions for Dan and Melinda were held frequently throughout January - May, first at MITRE and then at Commerce when equipment became available there
  - Addressed equipment care and maintenance, advice about operations, and discussions about effective use
- Approximately 800 MITRE staff hours (20 weeks) have been dedicated to teacher training and assistance activities

Training for Karen's Proposal

- Karen's experience with MAC Lab teaching is good preparation for Phase I of her proposal
- Phase I capabilities do not require familiarity with *multimedia, communications, or specialized applications*
- Karen participated in a Windows training session at MITRE in April, and has worked since then with Janet and Melinda
- Additional assistance will be necessary as equipment is installed to address PC and MS Windows system topics
  - *Maintaining the desktop*
  - Installing software
  - Diagnosing problems

Springfield Action Item: Determine summer availability of TIE teachers for additional training and related activities

Future Training Activities

- MITRE volunteers are ready to conduct training sessions either at MITRE or in Springfield, during the regular school year or over the summer, for interested teachers
- The Commerce classrooms represent a good locale for training, except when specific equipment is needed (a laser disk player, for example)

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Springfield School Department

No material provided

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Closure and Action Items

- Consumable Requirements
- Commerce Facility
- Final Checklist
- Action Items from Design Review

Consumable Requirements for Technology at the High School of Commerce

Consumable Items	Quantity Required for 6 months of operations in the three classrooms*	Cost for Quantity Required
VHS videocassettes	20 videocassettes	$80
8 mm videocassettes	20 videocassettes	$100
3.5 inch floppy diskettes	30 boxes of 10 each	$180
8.5 by 11 inch sheet paper	5 boxes of 5000 sheets each	$250
Printer toner & ribbons	6 cartridges	$600
Laser Printer clear film	3 boxes of 50 sheets each	$51
Total Cost of the Required Consumables		$1261

* French, Social Studies, and English Writing Classrooms

Commerce Facility Requirements for Springfield School Department

Furniture

Classroom 107 must have furniture for the technology discussed in the project Design Review. The furniture must support the teacher's concepts for the Individual, Peer, and Group Writing Process Models, the Class Discussion Model with the teacher technology corner, and the Student Research Project Model with a student research technology corner.

Electrical

Classroom 107 must have a sufficient quantity of fully functional electrical outlets that satisfy the electrical requirements for the initial and planned technology configurations. These outlets must be located in such a manner that the equipment configurations can be used on the selected furniture.

Phone and Phone Lines

Classroom 107 must have one (1) phone available for the teacher.

Classroom 107 must have two (2) fully functional phone lines, one that is accessible from the area designated for the teacher technology and the other one accessible from the area designated for the student research technology corner. These two phone lines must be capable of simultaneously making outgoing calls.

Projection Screen

Classroom 107 must have an adequate projection screen that can be clearly viewed from any location in the classroom as specified under The Springfield School Department obligations on page 5 of the Request for Proposals.

Windows and Window Coverings

Broken windows and windows with bullet holes must be replaced in the classroom. Classroom 107 must have fully functioning window coverings that can be adjusted to sufficiently darken each room such that the LCD panel displays are clearly visible from any location in the classroom.

Security

Classroom 107 must have the Sonitrol security system and any other required security measures installed and fully operational. The exterior doors for the room must have fully functioning locks in place. The storage closet must have a fully functioning lock for the storage of peripheral devices, an LCD panel, other technology, and consumable materials. The windows must be capable of being secured against intruders.

Communications

Classroom 107 must have user accounts for the research requirements of the teacher and the students. These accounts must be set up with accounts payable and billing procedures in place.

Final Checklist for Springfield School Department

Point of Contact

The Springfield School District must designate a point of contact to coordinate activities and requests for support from the teachers (Dan Battisti, Melinda Pellerin, and Karen Hachadourian) and MITRE as specified under The Springfield School Department obligations on page 5 of the Request for Proposals.

Funds for Additional Expenses

The Springfield School District must set up an account to fund additional expenses such as teachers' meetings and training outside of normal school hours as specified under The Springfield School Department obligations on page 5 of the Request for Proposals.

Technical Support

The Springfield School District must designate a technical support person in the selected school to maintain inventories of equipment and supplies, coordinate maintenance, and make sure the equipment and supplies are secured as specified under The Springfield School Department obligations on page 5 of the Request for Proposals.

Equipment Maintenance

The Springfield School District must develop and fund a maintenance plan that ensures the equipment will be properly maintained when maintenance responsibility is given to the School Department as specified under The Springfield School Department obligations on page 5 of the Request for Proposals.

Monthly Progress Reviews

The School Department must schedule monthly progress reviews as specified under The Roles and Responsibilities on page 6 of the Request for Proposals. The time and location of the first semester's reviews should be defined prior to the equipment installation.

Principal's Responsibilities

The Principal of the High School of Commerce must present a plan and budget to ensure that the facilities and equipment will be kept in good working order and that the equipment and materials are protected against theft and vandalism as specified under Principal of a Selected School on page 6 of the Request for Proposals. The Principal must also develop a plan and budget for flexibility in the teachers' schedules, allowing visitors to observe the teachers' classes, and providing other support required by the teachers as specified under Principal of a Selected School on page 6 of the Request for Proposals.

Action Items

The following are Action Items from the Design Review held 4 June 1993.

Action Item	Assigned To	Due Date	Description of Action
1	Springfield	18 June 93	Install Sonitrol and other security measures in Commerce Classroom 107. STATUS: Sonitrol is installed. This action item is CLOSED.
2	MITRE	depends on 1	Install the 19 individual writing stations in Classroom 107 within 2 weeks of the completion of Action Item 1. STATUS: The 19 workstations donated by DEC were installed and tested on 21 June 1993. All are functioning properly; each has been set up with the same logon password. Registration cards in the name of Karen Hachadourian, High School of Commerce, have been filed for the DEC PCs, with a warranty expiration of 12/93. Three printers donated by MITRE were also installed and tested on 21 June 1993. Only one printer has a power cord. Springfield will need to provide power cords for the other two printers. All three printers require print cartridges. All this equipment (printers and PCs) is now the property of Springfield. As such, Springfield is responsible for the maintenance, inventory control, and security (such as configuring machines so that all student files are saved to floppies as opposed to the hard disk) of this equipment as well as providing support and necessary consumable items. This action item is CLOSED.
3	Springfield	11 June 93	Provide available dates for teacher training during the summer. STATUS: No dates were submitted; therefore, MITRE will discontinue its teacher training efforts for Springfield. This action item is CLOSED.
4	Springfield	18 June 93	Install an appropriate projection screen in Commerce Classroom 107. STATUS: On 7 June 1993, MITRE provided the specifications for the projection screen to Ms. Williams and Mr. Battisti of the High School of Commerce. This action item is OPEN.

Action Item	Assigned To	Due Date	Description of Action
5	Springfield	18 June 93	The Central Office, the High School of Commerce administration, and the TIE teachers are to meet and formalize the process for the provision of consumables for the technology in Classrooms 105, 106, and 107. Provide plans, budgets, and schedules for consumables. STATUS: No joint meeting has been held yet. This action item is still OPEN.
6	Springfield	TBD	Install a phone and two phone lines in Classroom 107. STATUS: This action item is still OPEN.
7	Springfield	11 June 93	Install a lock on the closet door in Classroom 105. STATUS: This action item is still OPEN.
8	Springfield	18 June 93	Install appropriate projection screens in Commerce Classrooms 105 and 106. Screens should be the same size and type as those on loan from MITRE. STATUS: On 7 June 1993, MITRE provided the specifications for the projection screen to Ms. Williams and Mr. Battisti of the High School of Commerce. On 21 June, MITRE removed the screen that was on loan in room 106. MITRE will remove the screen on loan in room 105 at the completion of Mr. Battisti's language workshop. This action item is still OPEN.
9	Springfield	1 Aug 93	Repair the windows and window shades in Commerce Classroom 107. STATUS: The second window from the left with the broken/cracked glass on the bottom half has been repaired. The first window from the right with the crack and hole in the top half still needs to be repaired. The second window from the right still requires a window shade. This action item is still OPEN.
10	Springfield	mid Sept 93	Conduct follow-on discussions to MITRE schedule and budget installation of the teacher technology corner and the student research corner for Commerce Classroom 107. STATUS: This action item is still OPEN.

Action Item	Assigned To	Due Date	Description of Action
11	Springfield	18 June 93	Provide surge protection for the technology in Commerce Classrooms 105, 106, and 107. STATUS: This action item is still OPEN.